Expectations about recovery from acute non-specific low back pain predict absence from usual work due to chronic low back pain

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Expectations about recovery from acute non-specific low back pain predict absence from usual work due to chronic low back pain: a systematic review

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Question: Do negative expectations in patients after the onset of acute low back pain increase the odds of absence from usual work due to progression to chronic low back pain? **Design**: Systematic review with meta-analysis of prospective inception cohort studies. **Participants**: Adults with acute or subacute non-specific low back pain. **Outcome measure**: Absence from usual work at a given time point greater than 12 weeks after the onset of pain due to ongoing pain. **Results**: Ten studies involving 4683 participants were included in the review. Participants with acute or subacute pain and negative expectations about their recovery had significantly greater odds of being absent from usual work at a given time point more than 12 weeks after the onset of pain: OR 2.17 (95% CI 1.61 to 2.91). The exclusion of five studies with the greatest risk of bias showed that the result was similar when more rigorous quality criteria were applied: OR 2.52 (95% CI 1.47 to 4.31). **Conclusion**: The odds that adults with acute or subacute non-specific low back pain and negative recovery expectations will remain absent from work due to progression to chronic low back pain are two times greater than for those with more positive expectations. These results were consistent across the included studies despite variations in the risk of bias. **[Hallegraeff JM, Krijnen WP, van der Schans CP, de Greef MHG (2012) Expectations about recovery from acute non-specific low back pain predict absence from usual work due to chronic low back pain: a systematic review. *Journal of Physiotherapy* 58: 165–172]**

Key words: Low back pain, Patient expectations, Sick leave, Prognosis, Risk factor

Introduction

Acute low back pain is defined as pain, increased muscle tonus, and stiffness localised below the costal margin and above the inferior gluteal folds, sometimes accompanied by radiating pain, for up to six weeks. Pain that continues but does not exceed 12 weeks is defined as subacute, becoming chronic thereafter (van Tulder et al 2002, Koes et al 2006). The lifetime prevalence of low back pain is greater than 70% in industrialised countries (Airaksinen et al 2006). Several studies have reported that acute low back pain improves within four weeks, with 75–90% recovery and a relapse rate of 60% (Coste et al 2004, Grotle et al 2007). However, a small proportion of people with acute low back pain progress to have chronic low back pain (Waddell et al 2003, Waddell et al 2004).

Low back pain may cause a person to take sick leave or it may cause disability that limits a person's ability to perform usual work activities. Either of these can contribute to the period absent from usual work. Recall of sick leave is accurate over 2 to 3 months and reliable (Burdorf et al 1996, Severens et al 2000, Frederiksson et al 1998).

Some psychosocial factors measured in the acute or subacute stages of low back pain are predictors of progression, with the strength of the prediction being dependent on the time of measurement (Burton et al 2003). One psychosocial factor that we address in this review is the patient's prediction or expectations, which we define as what patients believe might occur. These expectations may be a prognostic indicator, perhaps by affecting clinical outcomes. The review of Iles and colleagues (2009) showed that recovery expectations measured within three weeks of the onset of low back pain are a strong predictor that the pain will become chronic. This prognostic relationship appears to exist despite high pain and disability levels in the acute phase (Iles et al 2008, Iles et al 2009). However, evidence to support the premise that patients' expectations predict the number of days absent from usual work is inconsistent (Schultz et al 2002, Schultz et al 2004, Dionne et al 2005, Heymans et al 2006, Du Bois et al 2009, Reme et al 2009). This inconsistency can be explained by variation in the methods used to assess the predictive relationship. Across studies there can be heterogeneity in the populations studied, the risk statistics reported, and the predictive measures considered. Even

What is already known on this topic: Acute low back pain is common and it becomes chronic in a small proportion of people. Some psychosocial factors measured in the acute or subacute stages of low back pain are predictors of progression to chronic low back pain.

What this review adds: Adults with negative expectations about their recovery during acute or subacute low back pain are more likely to remain absent from work more than 12 weeks after the onset of their pain, due to progression to chronic low back pain.

measurement of a single outcome can allow heterogeneity in the measurement instrument, its cut-off point, and the timeframe (Hayden et al 2009). The variability in the existing studies of patients' expectations makes it difficult to compare the results and summarise the findings. Meta-analysis could assess an overall effect but no meta-analysis has been performed concerning the predictive value of patients' expectations on work absenteeism due to progression of low back pain from acute to chronic.

Despite the inconsistencies in the evidence noted above, we aimed to draw a conclusion from the available evidence using meta-analysis about whether the recovery expectations of adults with acute or subacute non-specific low back pain are predictive of progressing to chronic low back pain that is severe enough to cause ongoing absence from usual work activities. We also aimed to examine the homogeneity of the studies and characteristics that may modify any predictive relationship. To do this, we sought to examine all primary data from prospective inception cohort studies of the recovery expectations of people with acute or subacute non-specific low back pain.

Therefore, the research question for this systematic review was:

> Do negative expectations about recovery in adults with acute or subacute non-specific low back pain increase the odds of absence from usual work due to progression to chronic low back pain?

Method

Identification and selection of studies

Four electronic databases were searched: PubMed, MEDLINE, EMBASE and PEDro. The search terms included: *low back pain*, *back pain*, *patient expectations*, *expectations about recovery*, *prognosis*, *prognostic*, *risk factors*, *risk*, *psychosocial*, *psychological*, *sick leave*, *sickness*, *absence*, *absenteeism*, *workers' compensation*, *redress*, *cohort studies* and *longitudinal studies* (see Appendix 1 on the eAddenda for the full search strategy.) The titles and abstracts of the retrieved publications were screened by two reviewers (JMH, MHGdeG) working independently to identify potentially eligible studies. Eligible studies were defined by the criteria in Box 1. However, studies meeting those criteria were excluded if they were published prior to 1999 or in a non-English language. Studies were also excluded if the participants had rheumatic disease, cancer, or trauma. The two reviewers were not blinded with respect to authors, journals, and results. Potentially eligible studies were retrieved in full text for further evaluation against the criteria. When an eligible study was identified, its reference list was checked for other potentially eligible studies. When eligible studies were identified, the same reviewers extracted data regarding the study design, the characteristics of the participants, details of the prognostic and outcome measures, and the duration of follow-up. The reviewers also extracted odds ratios or hazard ratios and their 95% CIs, or data that could be converted into these statistics. The two reviewers discussed any disagreements, seeking the advice of the other reviewers (WPK, CPvdS) if necessary to reach consensus.

Box 1. Inclusion criteria.

Design
- Prospective cohort studies
- Randomised trials analysed as cohort studies

Participants
- Adults aged 18 to 65 years
- Non-specific low back pain less than 12 weeks from onset of the pain
- Living in a Western, industrialised country

Predictor
- Expectations regarding recovery from low back pain, measured within 12 weeks from onset of the pain

Outcome measure
- Continued absence from usual work at a given time point greater than 12 weeks from onset of the pain

Analyses
- Odds ratios or hazard ratios expressing the increased risk of the outcome due to the predictor

Assessment of characteristics of studies

Quality: Two reviewers (JMH, MHGdeG) used the checklist of the Agency for Healthcare Research and Quality (AHRQ) to appraise the methodological quality of the included studies. The AHRQ checklist consists of nine items, which are presented in Table 1. When calculating the overall AHRQ score, studies that meet all nine criteria are given a score of 1, indicating the highest quality. The score for other studies is calculated by adding 1 for each criterion that is not met. Therefore, low scores reflect high quality, whereas high scores reflect low quality and major weaknesses. Criteria 1 to 3 and 8 assess external validity, criteria 4 to 7 internal validity, and criterion 9 assesses the statistical method. Scores less than 4 indicate a low risk of bias, scores of 4 to 6 indicate a medium risk of bias, and scores of 7 and above indicate a high risk of bias. Consensus was again reached by discussion or by intervention of a third reviewer where necessary.

Participants: The age and gender of participants were recorded for each study. The time since onset of the low back pain was also recorded. Data were extracted from each study regarding the recovery expectations of the participants.

Outcome measures: The number of days absent from work in a given period or time to return to work were recorded as outcome measures. Use of time absent from usual work as an outcome measure has a relatively low risk of bias (Ostelo and de Vet 2005).

Data analysis

Odds ratios (ORs) computed from logistic regression were used. These derived OR values from the various studies were summarised by calculating the pooled OR using meta-analysis. Random variation between the studies was incorporated by using a random effects model assuming that studies are closely related with a similar study question and that heterogeneity has been taken into account. The studies included in the meta-analysis reflect a random sample of the relevant distribution of ORs as effect sizes and the pooled

Table 1. AHRQ scores for all included studies (n = 10).

Study	Adequate selection of study population	Description of in-and exclusion criteria	Description of potential prognostic factors	Prospective study design	Study size >100	Follow-up > 3 months	Loss to follow up < 20%	Relevant outcome measures	Appropriate statistical analysis	AHRQ Score[a]
Dionne et al (2005)	N	Y	N	Y	Y	Y	N	Y	N	5
Hagen et al (2005)	N	Y	N	N	Y	Y	Y	N	Y	5
Kapoor et al (2006)	Y	N	Y	Y	Y	N	Y	Y	Y	3
Lotters et al (2006)	Y	Y	Y	Y	Y	Y	N	Y	Y	2
Reme et al (2009)	N	Y	N	N	Y	Y	N	Y	Y	5
Schultz et al (2004)	Y	Y	Y	Y	Y	N	N	Y	Y	3
Schultz et al (2005)	Y	N	Y	Y	Y	N	N	Y	N	5
Shaw et al (2005)	N	N	Y	Y	Y	N	N	Y	Y	5
Steenstra et al (2005)	Y	N	Y	Y	Y	N	Y	Y	Y	3
Turner et al (2006)	Y	Y	Y	Y	Y	N	N	Y	Y	3

[a]See text for scoring details.

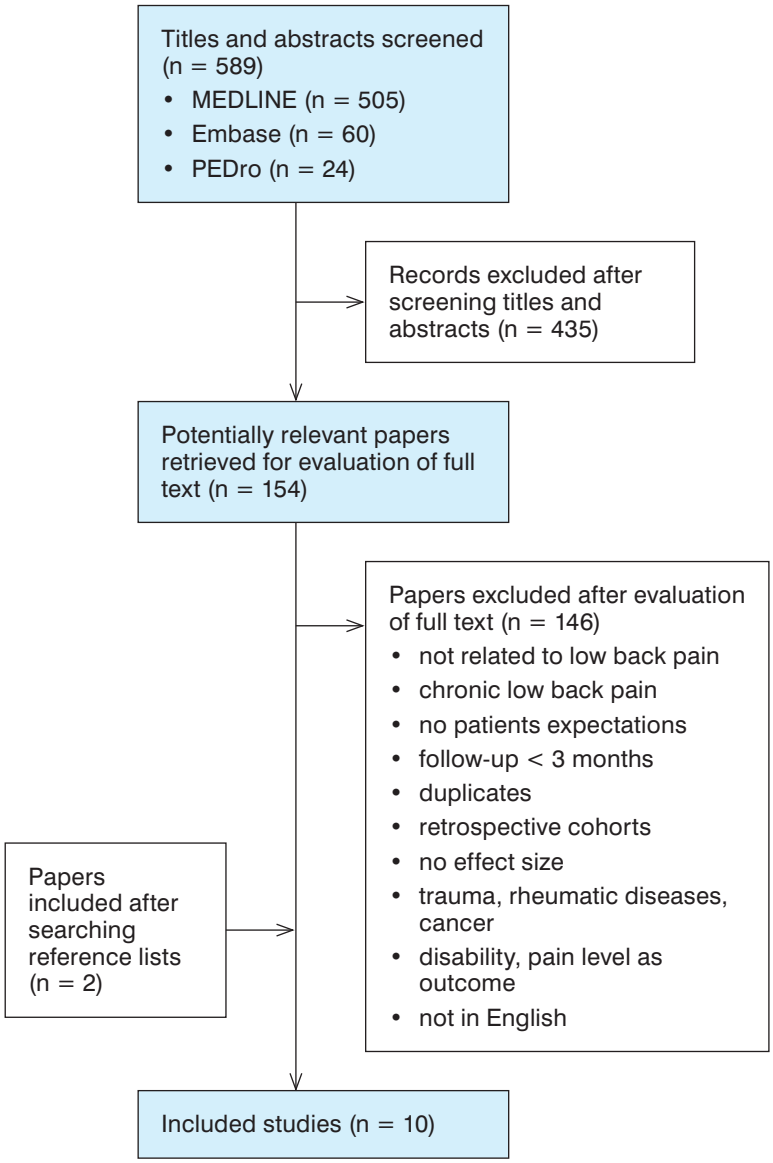

Figure 1. Identification and selection of studies for the review.

OR estimates the mean effect in this distribution. Study weights were assigned according to the inverse variance. Q values were calculated for estimating heterogeneity as the weighted sum of squared differences between individual study effects.

According to the classification of Hartvigsen and colleagues (2004), ORs between 1.50 and 2.00 were considered moderate, and higher ORs were considered strong. ORs were considered statistically significant if the 95% CI straddled 1.00. Publication bias was examined through visual inspection of asymmetry in a scatter plot and Egger's (1997) constant of regression. A sensitivity analysis was conducted based on trial quality. Only studies with a quality score < 4, ie, those with low risk of bias, were included in the sensitivity analysis to explore how methodological quality affects the overall result (Guyatt and Rennie et al 2002). The Statistical Programming Language R, version 2.14.0 was used for all analyses.

Table 2. Summary of included studies (n =10).

Study	Design	Participants	Stage	Prognostic factor	Outcome measure	Follow-up (months)
Dionne et al (2005)	Prospective cohort	n = 1007 Age (y) = 39 (SD 11) Gender = 589 M, 418 F	One day off work	Expect working without restrictions within 3 months: success, partial success, failure after attempt, and failure	Percentage chance of failure to return to work within 3 months Return to work in good health OR 2.08 (95% CI 1.05 to 4.12)	24
Hagen et al (2005)	Secondary analysis of data from RCT	n = 457 Age (y) = 41 (SD N/S) Gender = 238 M, 219 F	Within 4–12 weeks after onset One group in spine clinic	Do not believe low back pain will disappear: yes/no	Return to work Univariate OR 2.6 (95% CI 1.4 to 3.8) OR 2.3 (95% CI 1.4 to 3.8)	 3 12
Kapoor et al (2006)	Prospective cohort	N = 300 Age (yr) = 35 (SD N/S) Gender = 210 M, 90 F	Less than 14 days after onset	Will you be able to do work without restrictions within 4 weeks: positive or negative	Return to work Univariate OR 3.09 (95% CI 1.77 to 5.38)	3
Lotters et al (2006)	Prospective cohort	n = 129 Age (yr) = 43 (SD 9) Gender = 90 M, 39 F	Within 2–6 weeks sick leave	Workers' own perception return to work within 6 weeks Scale 1–10	Sick leave Univariate HR 2.43 (95% CI 1.61 to 3.66)	12
Reme et al (2009)	Secondary analysis of data from RCT	n = 246 Age (yr) = 41 (SD 11) Gender = 120 M, 126 F	Sick listed 8–12 weeks	Whether they expected to return to work within the next few weeks or not	Return to work Adjusted OR 4.2 (95% CI 1.7 to 10) OR 1.9 (95% CI 0.9 to 4.0) OR 2.0 (95% CI 0.9 to 4.3)	 3 12 24
Schultz et al (2004)	Prospective cohort	n = 159 Age (yr) = 40 (SD 11) Gender = N/S	Within 4–6 weeks after onset	Recovery expectations Return to work Scale 7 items (range 7–21) lower score indicate more positive expectations	Return to work Multivariate OR 1.27 (95% CI 1.10 to1.45)	3
Schultz et al (2005)	Prospective cohort	n = 100 Age (y) = 41 (SD 11) Gender = 62 M, 38 F	Within 4–6 weeks after onset	Expectations of recovery Scale 7 items scale (range 7–21) lower score indicates more positive expectations	Return to work Multivariate OR 1.21 (95% CI 1.01 to 1.45)	3
Shaw et al (2005)	Prospective cohort	n = 568 Age (yr) = 36 (SD 11) Gender = 385 M, 183 F	Within 14 days after onset, presenting to occupational health clinics	Will you be able to work without restrictions four weeks from now? Definitely/probably/not sure/ unlikely/no	Working without restrictions 4 weeks from now Multivariate OR 2.25 (95% CI 1.52 to 3.32)	3
Steenstra et al (2005)	Prospective cohort	n = 615 Age (yr) = 42 (SD 9) Gender = 222 M, 393 F	Within 2 days of work absence	Expected sick leave < 10 days or Expected sick leave > 10 days	Sick leave in days for at least 4 weeks Univariate HR 3.66 (95% CI 2.78 to 4.76)	6
Turner et al (2006)	Prospective cohort	n = 1068 Age (yr) = 39 (SD 11) Gender = 740 M, 328 F	Within 10–58 days	Expectations about working within 6 months Scale 0–10 higher score is more certain	Sick leave (work disability duration) Very low expectations adjusted OR 3.08 (95% CI 1.46 to 6.48)	6

N/S = not stated

Results

Flow of studies through the review

The electronic searches identified 589 publications, of which 154 were considered potentially relevant and were evaluated as full-text papers. Of these, 146 studies were excluded. Figure 1 presents the flow of the studies through the review and the reasons for exclusions. Searching the reference lists of the eight eligible studies identified another two eligible studies. Therefore 10 studies were included in the review (Schultz et al 2004, Steenstra et al 2005, Dionne et al 2005, Hagen et al 2005, Schultz et al 2005, Shaw et al 2005, Kapoor et al 2006, Lotters and Burdorf 2006, Turner et al 2006, Reme et al 2009).

Characteristics of included studies

Quality: Five studies had a low risk of bias, with AHRQ scores of 2 (Lotters et al 2006) or 3 (Schultz et al 2004, Steenstra et al 2005, Kapoor et al 2006, Turner et al 2006). The other five studies all had a moderate risk of bias, with an AHRQ score of 5. The quality criterion related to < 20% loss to follow up was met in only three of the studies (Hagen et al 2005, Steenstra et al 2005, Kapoor et al 2006). Consensus about quality interpretation was unanimous. Table 1 presents the quality of the studies and Table 2 presents the characteristics of the studies.

Participants: The total number of participants in the 10 included studies was 4683. Overall, 59% of the participants were male, although one study listed no gender details (Schultz et al 2004). The mean age of participants in each study ranged from 35 to 43 years.

Outcome: Absence from usual work in a given period was reported using different terms such as 'not return to work', 'sick leave', 'work absenteeism', 'sickness absenteeism', and 'compensated sick leave'. Follow-up time ranged from 3 to 24 months.

Prediction of absence from work by recovery expectation

The standard error of the estimated ORs of the 10 included studies was computed from the confidence intervals, presented in Table 2. From these, the weights were computed using the inverse variance method to calculate the heterogeneity statistic Q = 96.23, $p < 0.0001$, df = 9 (Egger et al 2001). Because homogeneity was rejected, the DerSimonian and Laird random effects model was estimated yielding a tau squared equal to 0.19. The corresponding weights and pooled OR of 2.17 (95% CI 1.61 to 2.91) are presented in Figure 2 (see also Figure 3 on the eAddenda for a detailed forest plot.) The 95% CIs of all but one of the studies, as well as that of the pooled result, lie to the right of 1.00, indicating significantly greater risk of absence from usual work among participants whose early expectations about their recovery were poor.

For the sensitivity analysis, the standard error of the estimated ORs of the 5 studies with low risk of bias was computed from the 95% CIs. From these, the weights were computed using the inverse variance method to calculate the heterogeneity statistic Q = 43.83, $p < 0.0001$, df = 4 (Egger et al 2001). Because homogeneity was again rejected, the DerSimonian and Laird random effects model was estimated yielding a tau squared equal to 0.34. The corresponding weights and pooled OR of 2.52 (95 % CI 1.47 to 4.31) are presented in Figure 4 (see also Figure 5 on the eAddenda for a detailed forest plot.) The confidence intervals of the five studies with low risk of bias as well as that of our pooled result all lie to the right of 1.00, again indicating significantly greater risk of absence from usual work among participants whose early expectations about their recovery were poor.

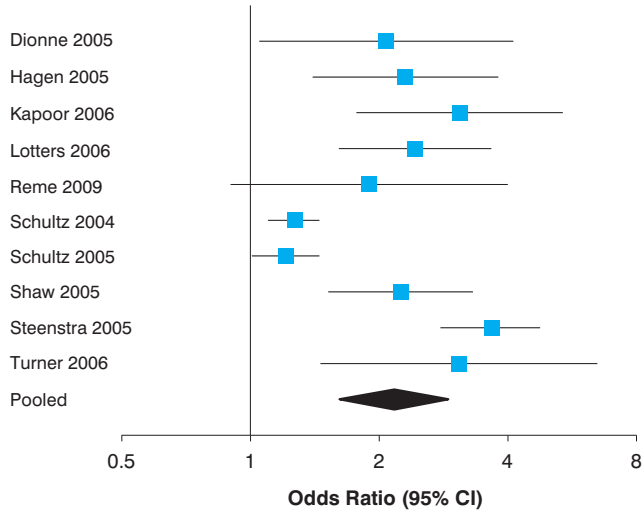

Figure 2. Odds ratios (95% CI) of the association between recovery expectations during acute or subacute non-specific low back pain and being absent from usual work due to low back pain beyond 12 weeks, pooling data from the 10 included studies (n = 4683). Odds ratios greater than one indicate greater odds of absenteeism among people with more negative recovery expectations.

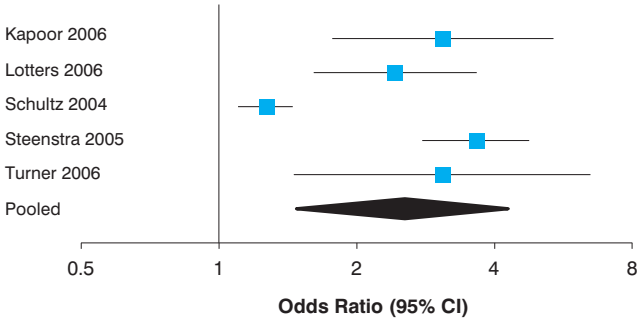

Figure 4. Odds ratios (95% CI) of the association between recovery expectations during acute or subacute non-specific low back pain and being absent from usual work due to low back pain beyond 12 weeks, pooling data from the 5 included studies with higher quality (AHRQ score < 4) (n = 2271). Odds ratios greater than 1 indicate greater odds of absenteeism among people with more negative recovery expectations.

In order to detect whether publication bias might be affecting the cohort of studies we included in the review, a regression analysis was performed using precision as a predictor for standard normal deviates (Egger et al 1997). The standard normal deviates were computed by dividing the ORs with their corresponding standard error and the precision was computed as the inverse of the standard error.

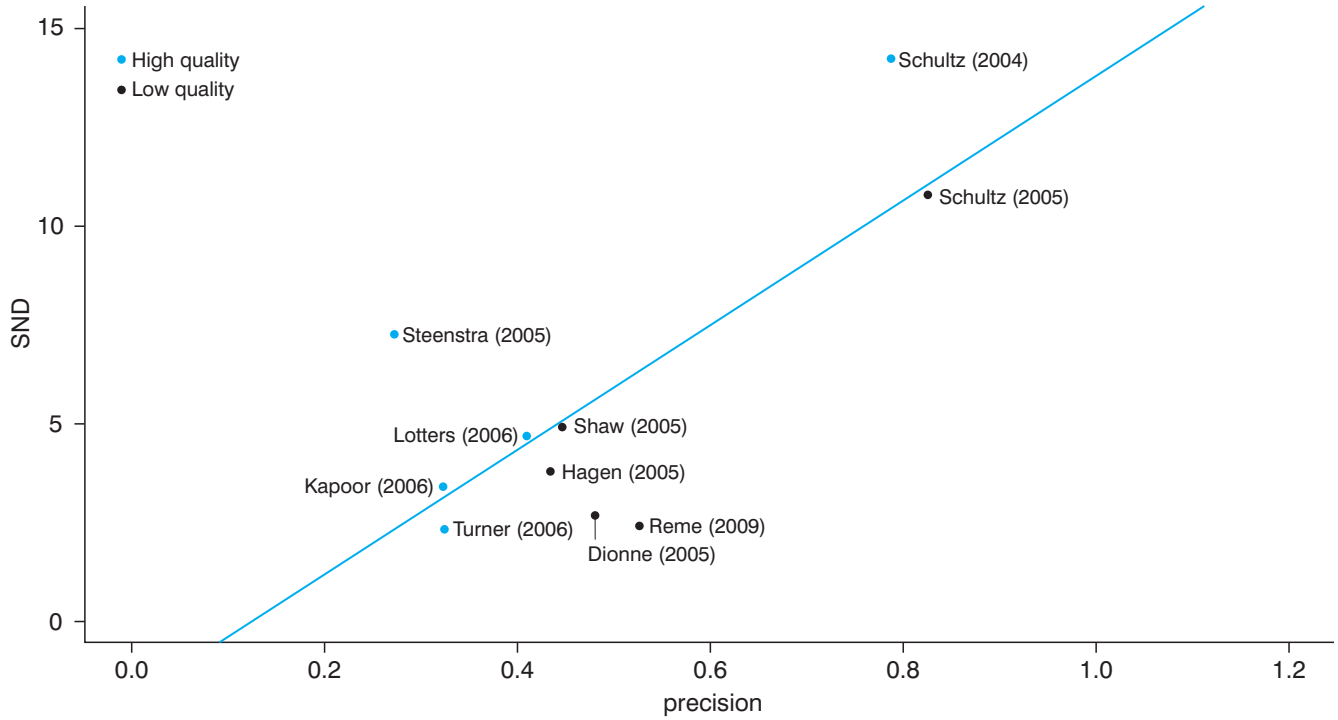

Figure 6. Scatterplot of precision versus standard normal deviates (SND) from the Odds Ratios of the included studies (n = 10).

A marginal t-test of the constant (t = –0.770) yielded a *p* value of 0.46 indicating no publication bias, which is in line with the observation that there is no clear asymmetry in the scatterplot (Figure 6.)

Discussion

This review confirmed that the recovery expectations of patients with acute or subacute non-specific low back pain are a statistically significant predictor of absence from usual work due to progression to chronic low back pain. The odds of remaining absent from work at a given time point beyond 12 weeks after the onset of the pain were two times higher among those with negative expectations about their recovery. This pooled result (OR = 2.17, 95% CI 1.61 to 2.91) indicates a strong predictive value. In addition, our analysis yielded consistent evidence of this prognostic role of patients' expectations. That is, negative expectations about recovery were a strong predictor of future work absence despite variations in follow-up time and the use of different measurement instruments. Across the individual studies, the ORs were all greater than 1.00 and almost all were statistically significant, indicating robust evidence from this meta-analysis (Lewis and Clarke 2001). This result was also still evident when more rigorous eligibility criteria were applied to ensure only high quality studies were contributing data to the meta-analysis.

No indication of publication bias was shown by our analysis (Egger et al 1997). However, as a consequence of the limited number of studies on which the scatter plot was based, our conclusion with respect to publication bias is preliminary (Lau et al 2006). Another limitation of this review is that, although low back pain is a multifactorial problem, only one potential prognostic factor was examined.

All measures of participants' recovery expectations were carried out within the first three months of non-specific low back pain. However, in contrast to Burton et al (2003) and Iles et al (2009), in this review strength of prediction was not related to time of measurement within these three months. Moreover, Steenstra et al (2005) provided the largest effect size despite patients' expectations being measured within two days of the onset of the pain.

We recommend that physiotherapists screen patients' expectations in the acute stage of low back pain so that strategies can be targeted to those most at risk of absence from work in a given period due to progression of their low back pain into the chronic phase. For example, we suggest counselling patients with more negative expectations and the development of guidelines to screen patients' recovery expectations as a psychological construct. An effective coaching strategy can affect how patients handle their recovery expectations (Iles et al 2011). A number of studies substantiated the need for screening, and if necessary, for quick intervention by providing information directly after onset (Perrot et al 2009, Kapoor et al 2006, Pengel et al 2003, Linton and Hallden 1998). Thus, in future research, patients' expectations should be included in a core set of factors predicting chronic low back pain.

Interpreting low recovery expectations of a patient is difficult due to the complex mental states that underlie an individual's expectations (Cedraschi and Allaz 2005, Baxter et al 2008, Henschke et al 2008). Although different measurement tools were used in the included studies, it may be worth considering the problems that patients encounter when describing their expectations. This might influence the content validity of the construct and future research should be focussed on interpretation of this construct. There is a

need for further studies to develop a specific measurement instrument for patients' expectations. Determination of a sound definition of the construct might be a first step to develop such an instrument.

In conclusion, unlike earlier systematic reviews, which reported that the recovery expectations of people with acute low back pain are a prognostic factor for future absence from usual work in a given period, this review and meta-analysis provides a numerical estimate of the overall effect of the prognostic role of this construct and offers consistent and conclusive evidence for predicting chronic low back pain, as reflected in ongoing absence from work beyond 12 weeks after the onset of the pain. ■

eAddenda: Figure 3, Figure 5, and Appendix 1 available at jop.physiotherapy.asn.au

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